

Pengembangan Produk Kosmetik Anti-aging yang Mengandung Protein Hidrolisat dari Mikroalga *Nannochloropsis* sp. = Development of Anti-aging Cosmetic Product Containing Protein Hydrolysate From *Nannochloropsis* sp. Microalgae

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Abstrak

Mikroalga *Nannochloropsis* sp. memiliki kandungan biomassa bervariasi, salah satunya protein. Hidrolisis protein menghasilkan peptida dan asam amino sehingga meningkatkan bioaktivitas dari protein. Penelitian ini bertujuan untuk mendapatkan protein hidrolisat dari mikroalga *Nannochloropsis* sp. serta mengetahui keamanan dan efektivitasnya sebagai produk kosmetik anti-aging. Protein hidrolisat mikroalga *Nannochloropsis* sp. (PHMN) diperoleh dari proses hidrolisis menggunakan enzim alkalase. PHMN dievaluasi perolehan rendemen, derajat hidrolisis, kandungan proksimat, asam amino serta aktivitas anti-elastasenya. PHMN diformulasikan menjadi sediaan emulgel, kemudian dievaluasi sifat fisikokimia dan stabilitasnya. Uji keamanan produk kosmetik PHMN dilakukan dan efektivitas produk kosmetik PHMN sebagai anti-aging dievaluasi dengan mengukur serat kolagen, elastisitas, dan kelembaban kulit relawan. Protein hidrolisat yang diperoleh memiliki nilai rendemen sebesar $25,77\% \pm 3,16\%$ (b/b), derajat hidrolisis sebesar 36,73%, dan mengandung asam amino yang didominasi oleh asam glutamat, asam aspartat, dan leusin. Nilai konsentrasi penghambatan setengah maksimal (IC₅₀) PHMN sebagai anti-elastase yaitu 244,43 mg/mL. Produk kosmetik PHMN menunjukkan stabilitas yang baik yaitu homogen dan kadar yang stabil setelah 24 minggu. Penggunaan produk kosmetik PHMN tidak menyebabkan iritasi dan meningkatkan serat kolagen, elastisitas, dan kelembaban kulit setelah 28 hari. Dari penelitian ini disimpulkan bahwa diperoleh protein hidrolisat dari mikroalga *Nannochloropsis* sp. serta produk kosmetik PHMN memiliki karakteristik yang baik, aman, dan efektif sebagai anti-aging

.....Microalgae *Nannochloropsis* sp. contain various biomass composition including protein. Protein hydrolysis generate peptide and amino acids so that protein bioactivity improves. The purpose of study was to obtain protein hydrolysate from *Nannochloropsis* sp. microalgae, also assess its safety and efficacy as anti-aging cosmetic product. *Nannochloropsis* sp. protein hydrolysate (NPH) was obtained from microalgae through enzymatic hydrolysis using alkalase enzyme and characterized for yield, degree of hydrolysis (DH), proximate content, amino acids composition, and anti-elastase activity. NPH was formulated as emulgel, then evaluated for physical characteristics and stability. NPH cosmetic product was evaluated for safety and efficacy as anti-aging by measuring collagen fibers, elasticity, and moisture in volunteers. NPH was obtained with yield of $25.77 \pm 3.16\%$ (w/w), DH value of 36.73%, and amino acids dominated by glutamic acid, aspartic acid, and leucine. Half-maximum inhibitory concentration (IC₅₀) value as anti-elastase was 244.43 µg/mL. NPH cosmetic product showed good stability which homogenous and had stable protein content after 24 weeks storage. NPH cosmetic product usage did not cause skin irritation and increased collagen fiber, elasticity and moisture after 28 days. In conclusion, protein hydrolysate was obtained from *Nannochloropsis* sp. microalgae and NPH cosmetic product had good characteristic, safe, and effective as anti-aging.